



# Sir Harry Smith

## Biology Department

### Welcome

Dear student,

Welcome to Sir Harry Smith and congratulations on your decision to join us in the Biology department!

We hope that you have an enjoyable and successful time here.

Now that you've chosen to study biology in more depth, you may be feeling rather unsure about starting your Biology course. But don't worry – this guide has been designed to help you work through your course! A level and GCSE courses have recently changed, and some of these changes have made the GCSE course a better preparation for the AS one, making the move to AS easier and more logical. Consequently, you should already be familiar with most of the major topics and important terms covered by the AS biology course, for example, cell structures and the differences between plant and animal cells. You may need to refresh your memory on some of these though!

## AS & A2 Biology WELCOME BOOKLET & STUDENT GUIDE 2014-15

Name

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### What is the AS biology course like?

Before you begin your AS biology course it is important that you read through these pages for advice on how to make the step up to AS and gain the best grade you can.

A good starting point is to realise that you (not just your teacher!) should know the awarding body specification and check the topics, terms and definitions required. You will be given a copy of the specification at the start of the year and will need to refer to it regularly. The specification and your textbook will highlight important things to concentrate on, such as where to emphasise detail. For example, your OCR specification states: "Explain what is meant by osmosis in terms of water potential (*no calculations of water potential will be required*)". This tells you several things. Firstly, you will see that a familiar topic is involved – osmosis. Secondly, a new term has been introduced – water potential – but you don't need to use it in detail (*no calculations needed*). Understanding and using the specification and textbook in this way is essential. Be warned though – they do occasionally throw in calculations and you should listen to your teacher closely for guidance on areas where they might do this! They do this as you are expected to read around the subject for Biology, past the specification. This is the only way to gain the higher grades!

You can find the specification on the OCR website: <http://www.ocr.org.uk>.

## **The enjoyment factor**

Biology is the scientific study of life. We are living things ourselves so biology is about us too! Discovering how your body works and fits in with other living things is fascinating – hopefully you already enjoy this aspect of biology.

During your AS course, you will get the chance to delve deeper into *why* things are the way they are. It can be very satisfying to really grasp the more difficult concepts and the links between them.

Most of us enjoy a good medical story and so much of AS biology is about the human body – how it works, its health and diseases. If you prefer more up-to-date, technological topics, AS biology covers cutting edge issues too. These can include DNA technology, which can even make news headlines!

However if you are more *hands-on*, then biology at AS is also very much about seeing and doing.

## **What are the main differences between GCSE and AS biology?**

Although there is much overlap in topics and terms, there is quite a lot of *new material* that you won't have met before. Also, you need to go into more *detail* regarding the topics you are already familiar with and your level of *thinking and explaining* has to be deeper.

### **• New material**

There will be many more facts and unfamiliar terms to learn and recall in exams than there were at GCSE. Examples of new areas include the structure of cell membranes, the immune response and classification. Don't be put off by all the complex terms you will start to come across, they are important for scientists to communicate *precisely* what they mean, and as your AS course progresses you will become more comfortable and confident with using them.

### **• Detail**

You must be prepared to go into a topic or subtopic in **much** more detail than at GCSE. This sometimes means using specific examples of what you know in general (e.g. named examples of types of body tissues). It might involve describing something in much more detail than before (e.g. exactly how your heart beats and how this is controlled). Another good example is mitosis – if you can't remember what it is, have a quick look at your GCSE notes! For AS biology you need to name and explain what happens in each *stage* of mitosis and show an *understanding* of why these things happen. This brings us on to ...

### **• Thinking and explaining**

As well as going into more detail and giving examples wherever you can, you need to *justify* your statements and *apply* your knowledge and skills to unfamiliar examples. Justifying what you are saying in AS biology often involves relating structure to function, i.e. explaining why something looks the way it does or why a particular structure allows it to function. For example, knowing the detailed structure of the cell membrane allows you to explain its many functions. Now you can apply this knowledge to discuss how an unfamiliar medical drug might work by changing the structure of the membrane.

## • Developing practical skills

You will develop your practical skills further in AS biology, such as *using* the microscope to measure and calculate sizes of cells. In fact, there is a unit devoted to practical assessment – worth 20% of the whole AS course mark and 10% of A level– so you should take every opportunity to practise your experimental/lab skills. There will also be a second practical assessment unit within the second year.

## Organising yourself during the course

Compared with your A level course, your GCSE course in school was less detailed and your progress was more structured. At AS you need to structure your own personal study. You need to *organise* yourself and do it in advance as much as possible. Everything from paper, pens, folders and a hole punch to textbooks and specifications (we'll come back to this). And finally, construct a *time planner* (daily, weekly and termly). At AS you are likely to cover more than one biology topic in the same week – depending on how your classes are organised – so you will have notes, hand-outs, homework, practicals and suggested reading for each topic. This will be the same for *each* subject such as chemistry, physics etc. that you are studying! But remember, we are all different and the way you work should suit *you* and may be different from how other students work. In Biology, we will collect your class notes in from time to time to see your progress and to ensure that you are staying on top of your class notes and wider reading/research.

**Remember, the only way that you will get good grades in A level biology is through working smartly!**

## Course structure

There are two taught units in AS (F211, F212) and two in A2 (F214, F215) with F213 and F216 being practical assessment (see later section). Within each unit there are between 2 and 5 topics.

Mandatory/Optional?	Unit title and description	Assessment method and weighting
<b>AS Level</b>		
<b>Mandatory</b>	F211: Cells, Exchange and Transport <ul style="list-style-type: none"> <li>• Cells</li> <li>• Exchange and Transport</li> </ul>	1 Hour written exam AS level – 30% A Level – 15%
<b>Mandatory</b>	F212 – Molecules, Biodiversity, Food and Health <ul style="list-style-type: none"> <li>• Biological Molecules</li> <li>• Biodiversity and Evolution</li> <li>• Food and Health</li> </ul>	1 Hour 45 mins written exam AS level – 50% A Level – 25%
<b>Mandatory</b>	Practical skills in Biology 1 <ul style="list-style-type: none"> <li>• Internal assessment of practical skills</li> </ul>	Internal assessment AS level – 20% A Level – 10%
<b>A2 Level</b>		
<b>Mandatory</b>	F214: Communication, Homeostasis and Energy <ul style="list-style-type: none"> <li>• Communication &amp; Homeostasis</li> <li>• Excretion</li> <li>• Photosynthesis</li> <li>• Respiration</li> </ul>	1 Hour 15 mins written exam A Level – 15%
<b>Mandatory</b>	F215 – Control, Genomes and Environment <ul style="list-style-type: none"> <li>• Cellular control</li> <li>• Biotechnology and gene technology</li> <li>• Ecosystems and sustainability</li> <li>• Responding to the environment</li> </ul>	2 Hours A Level – 25%
<b>Mandatory</b>	Practical skills in Biology 2 <ul style="list-style-type: none"> <li>• Internal assessment of practical skills</li> </ul>	Internal assessment A Level – 10%

## Exam

Exam Title	Date	Length
<b>F211 – Cells, Exchange and Transport</b>	June	1 Hour
<b>F212 – Molecules, Biodiversity, Food and Health</b>	June	1 Hour 45 mins
<b>F213 – Practical skills in Biology 1</b>	<i>Anytime</i>	3 x 1hr
<b>F214 – Communication, Homeostasis and Energy</b>	June	1 Hour 15 mins
<b>F215 – Control, Genomes and Environment</b>	June	2 Hours
<b>F216 – Practical skills in Biology 2</b>	<i>Anytime</i>	3 x 1hr

These timings are subject to change

## • How do you work throughout the course?

Don't just slog! By just putting in the hours (in class or at home) but not being efficient or not testing yourself you may literally waste that time. Reading through or rewriting notes is a start but you also need to *process your study*. Now is a good time to look back at how you worked and revised for GCSE. Make a note of what worked and where it went wrong – remember, everyone is different, and you should find out what suits *you*, develop a routine and stick to it.

*Processing* your work is very important. It means engaging with the concepts and facts and reorganising them somehow, not just reading a book and hoping it goes in. How do you process information? There are many ways of doing this – some of which will suit you while others won't – here are some suggestions.

### (a) Bullet points and practice questions

Instead of rewriting notes word for word (tedious!), you could write out revision bullet points, preferably from memory. You could also answer questions such as those found in the textbook or use online revision sites such as *Exams Tutor* (<http://www.examtutor.com/biology/>), as well as the multiple choice quizzes and sample student answers on the Exam Café CD. You will also find revision flashcards on the Exam Café CD or you could make your own.

### (b) Working with others

Another good way to process information is to explain it to others – teachers will tell you that they only really understood some things when they had to teach them for the first time! If you can find a friend who will partner you regularly, you can explain topics to each other. This will be a great way of processing and understanding the work – and be a bit more fun too (beware of distracting each other though!).

### (c) Use manageable chunks

It is easy to feel overwhelmed by a whole unit, module or topic but if you approach it week by week in smaller chunks, it will feel manageable. But you have to be organised and work regularly to keep up with the constant flow of new material.

### (d) Reflect

You'll find that you have a lot to revise in a lot of detail when it comes to your exams, so go back over your notes regularly. It takes at least 3 times of learning something for you to remember it, and more than this for you to be able to really evaluate it. A few minutes, little and often is the best way to approach this.

## • How do you remember facts?

There are many more facts, terms and definitions in A level biology compared with GCSE. Many of these will be unfamiliar, and feature more complex terminology. However, some are more important than others and there are ways of dealing with them.

### **(a) Multi-coloured highlighting**

A good starting point is the specification itself. Here, the key terms are picked out for you and you will find similar key terms and definitions highlighted in your textbook. Highlighting in your notes or making your own glossary (look at the one in your textbook) are good ways of making key facts memorable and familiar.

### **(b) Study skills**

Once again, memorising is an individual skill; everyone is different in how they learn. However, certain things are known about how we learn. These can be found in study skills books such as the *Sciences Good Study Guide* from the Open University, which is well worth a look. You can also use revision/study websites (see above).

### **(c) Reminder notes and concept mapping**

We have mentioned that explaining to others is a good way of learning, but for more personal study you need to consider things such as note writing and memory techniques as well as revision, self-testing and practising exams. Visual memory is far better than verbal memory – it uses a different part of your brain and is more efficient. So make your study and revision notes as visual as possible. Use your own drawings, flow charts and diagrams. Some people also like to use *concept maps* or *spider diagrams*, especially for revision. If you have never done one of these, have a go. Mrs Lancaster used to cover her house in her revision mind maps and over a few weeks, you really do learn the flow charts and detail that they cover!

## **• Examination papers**

Exam questions are chosen by the OCR awarding body very carefully to test your knowledge and understanding of the specification. You should plan to *practise exam questions as you go along*, not just before you sit an exam. However, once a whole unit is nearing completion, you need to practise whole papers to get a feel of what it is like in a real exam. You will be used to this from GCSE, including mock exams arranged by your school. Do as many of your own *mocks* as you can.

Past papers, mark schemes and examiners' comments are all readily available. Your textbook has valuable past questions, tips and comments from examiners throughout – take note of these as you go along (maybe copy them out into your own notes?). The OCR website (<http://www.ocr.org.uk>) has the specification and sample mark schemes/examiners' comments. Be careful to use only OCR materials for exam preparation because different awarding bodies have slightly different definitions and content. Your textbook has been written especially for the OCR specification. It uses all the right terms and exam requirements, so make it your first point of reference. You will find sample student answers on the Exam Café CD.

# Careers in Biology

Biology can open the doors to many careers and is often a good 'link subject' between science and arts subjects. Here are some careers in which further study in biology will be an advantage if not a requirement. You'll also find that even non-scientific careers are keen to recruit those with Biology A levels because it is one of the hardest marked examinations and the completing the course successfully shows that you have an analytical approach and rigour.

## **Forensic Scientist**

A forensic scientist works with law enforcement agencies to investigate crime. Forensic scientists might be responsible for collecting or analysing evidence, analysing a crime scene to determine what occurred or creating DNA profiles of victims and suspects.

## **Conservation Biologist**

A conservation biologist is concerned with the preservation of natural resources and studies the impact of human beings on the environment.

## **Toxicologist**

Toxicologists study the nature and effects of toxins on various organisms, including humans, plants and animals. Medical examiners often use toxicology reports to rule out causes of death, and many environmental and pharmaceutical companies employ toxicologists to conduct research.

## **Geneticist**

Geneticists study human, animal and plant genetics to determine the causes of diseases and defects. Geneticists conduct research in a number of different areas, including agriculture, pharmaceuticals, epidemiology and reproduction.

## **Environmental Consultant**

Environmental consultants may work with environmental organizations, businesses or federal agencies to formulate new environmental programs; look for ways to reduce environmental costs; or aid in developing marketing strategies for environmental products.

## **Pharmaceutical Sales Representative**

Pharmaceutical sales representatives are responsible for promoting and selling pharmaceutical products to individuals and organizations within the health care industry. These representatives regularly interact with doctors, hospitals and medical organizations, and they're responsible for providing accurate information about their product.

## **Zoologist**

Zoologists are concerned with the study of animal biology and behaviour. Zoologists might work for a zoo or a wildlife reserve, or they may work independently, conducting research on specific behaviours or groups within the animal kingdom.

## **Marine Biologist**

Marine biologists are concerned with the study of the plants and animals that live in marine environments. Marine biologists may work in a laboratory setting, on a research ship, or they may study specific marine environments such as wetlands or sea marshes.

## **Forester**

Foresters are responsible for the care and management of woodland areas. Foresters may work for federal agencies, such as the National Forestry Service, or they may work with private organizations such as a timber or logging company.

## What careers your Biology teachers had before teaching

### Mr Barker

Mr Barker was a sales representative and trainer for a food manufacturer before training as a Biology teacher.

### Mrs Lancaster

Mrs Lancaster was a senior microbiologist for an analytical consultancy. She was involved in performing turbidimetric assays for vitamins, meat speciation using PCR and testing for antibiotic levels in food and animal feed.

### Mr Mossman

Mr Mossman handled external referrals to children's social services and allocated which interventions were put into place by external agencies such as the police.

### Mr Pettit

Mr Pettit began his career as a behavioural science researcher in Berlin before working as a research assistant for a project investigating various neurological diseases including Alzheimer's and Schizophrenia.

## Useful sources of information

- Useful websites (not an exhaustive list – try Google for others)

[www.biozone.co.uk](http://www.biozone.co.uk)

This is an excellent gateway to many other websites with useful material to support topics in both AS and A2. Click on Biolinks on the home page.

[www.biologymad.com/](http://www.biologymad.com/)

This site is full of useful notes to support AS and A2 topics and also useful web links and advice for students.

[www.s-cool.co.uk](http://www.s-cool.co.uk)

Many web pages of structured notes

<http://www.biology-innovation.co.uk/>

Useful diagrams for AS and A-Level Human Biology topics.

[www.biology.com/](http://www.biology.com/)

Click on The Biology Place and find tutorials, animations and tests on a variety of topics including common A level Biology practicals.

[www.who.ch](http://www.who.ch)

Use this website to find up-to-date information on infectious and non-infectious diseases.

<http://www.s-cool.co.uk>

Use the search functions to find a host of resources that some teachers have even been known to use!

<http://www.examtutor.com/biology/>

Fantastic revision website which even has podcasts for all the topics! Also a great revision planner.

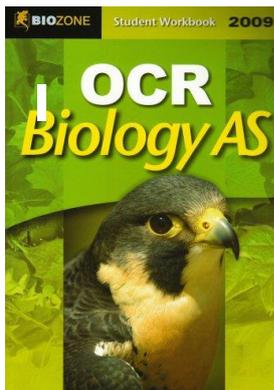
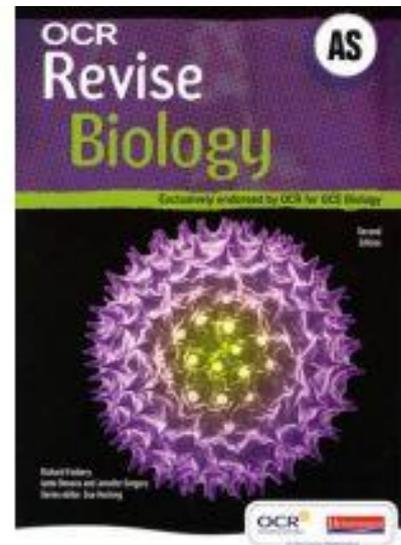
- Useful books

**Recommended** - Revise OCR AS Biology By: Richard Fosbery, Ianto Stevens, Jennifer Gregory

*The book is designed to complement your AS textbook and is made by the same publishers.*

**Cost –£5 - £7**

**An A2 version is also available**

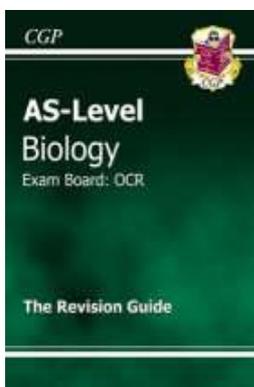
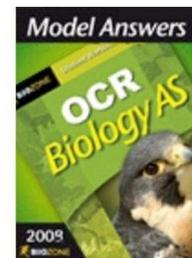


**Recommended** – Biozone OCR AS Biology workbook and model answers book

*This workbook contains hundreds of worksheets to complete, very different from a revision guide. The worksheets are more detailed than the course textbook & is therefore a good way of stretching yourself to achieve those top grades. There is also an excellent section on practical skills.*

**£12-14**

**An A2 version is also available**



**Recommended** - AS Level Biology OCR Revision Guide By Richard Parsons,

*For those of you already familiar with CGP revision guides from GCSE this is for you. Not a great use of colour or pictures but it does contain all the key knowledge required.*

**£7-8, with their version of the full textbook for £15-16**

**An A2 version is also available**

**Data and Data Handling for A2 Level Biology By: Bill Indge**

*Could be used to help you prepare for the assessed practical exams.*

**New Scientist Magazine** – Available from your newsagent or online

**Sign up for these publications too and have them delivered to your home or read online for free!**

**The Big Picture – The Wellcome Trust**

<http://www.wellcome.ac.uk/Education-resources/Education-and-Learning/Big-Picture/index.htm>

**Catalyst – The national STEM centre**

<http://www.nationalstemcentre.org.uk/catalyst>

- Other sources of information



Your AS/A2 books have a CD at the back.

**CD Contents:**

- Advice on study skills
- Interactive questions
- Textbook exam question answers
- Content checklists
- Revision planner
- Revision flashcards
- Stretch yourself questions
- links to OCR's partnership to New Scientist

**GOOD LUCK IN YOUR STUDIES; WE HOPE YOU ENJOY THE COURSE!**

**Mrs Lancaster, Mr Barker, Mr Pettit and Mr Mossman**